

CLAIMS

[0091] What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. In a Radio Frequency Identification (RFID) system used to read RFID tags, an antenna configuration comprising:

a first reader antenna oriented in a first plane; and

a second reader antenna oriented in a second plane;

wherein said first and second reader antennae are respectively oriented to reduce dead zones for the reading of RFID tags.

2. The antenna configuration of claim 1, further comprising a third reader antenna in a third plane, wherein the first, second and third planes are oriented in orthogonal planes relative to one another so as to reduce to zero the number of dead zones for the reading of RFID tags.
3. The antenna configuration of claim 1, wherein said first reader antenna has a first loop form encircling a volume in the first plane; and said second reader antenna has a second loop form wrapped around two opposing sides of said

volume, wherein the opposing sides are parallel to each other and orthogonal to the first plane.

4. The antenna configuration of claim 3, wherein at least one of the first and second loops has at least one serpentine path.
5. The antenna configuration of claim 3, wherein the volume is a bin for holding items respectively associated with RFID tags.
6. The antenna configuration of claim 3, wherein at least one of said first and second reader antennae is made of coaxial cable.
7. The antenna configuration of claim 3, wherein at least one of said first and second reader antennae is in the form of a loop made of microstrip construction.
8. The antenna configuration of claim 6, wherein said first reader antenna is in the form of a loop having a balun incorporated within the coaxial cable.
9. The antenna configuration of claim 8, wherein the balun of said first reader antenna is formed by removing a portion of an outer conductor of the coaxial cable.

10. The antenna configuration of claim 7, wherein a balun is incorporated within the microstrip loop at approximately a midpoint of the loop opposite a feed point.
11. The antenna configuration of claim 10, wherein the balun is formed by removing a portion of a ground plane conductor of the microstrip.
12. A Radio Frequency Identification (RFID) reader system for use in reading an RFID tag associated with an item, the system comprising:
- at least one reader antenna positioned in a plane; and
 - a form factor for supporting a plurality of items respectively associated with a plurality of RFID tags;
- wherein said form factor forces the plurality of items into specific orientations for reading by said at least one reader antenna.
13. The Radio Frequency Identification (RFID) reader system as recited in claim 12, wherein said form factor comprises:
- a rear plane for housing said at least one reader antenna;
 - a supporting surface for supporting the plurality of items on said form factor; and

a retaining structure for forcing the plurality of items into specific orientations relative to said at least one reader antenna.

14. The Radio Frequency Identification (RFID) reader system as recited in claim 13, wherein the plurality of items are DVD products, and wherein said retaining structure forces the DVD products into an orientation which is in a plane parallel to the plane of said at least one reader antenna.

15. The Radio Frequency Identification (RFID) reader system as recited in claim 12, wherein said at least one reader antenna comprises first and second reader antennas, and wherein said form factor is a container for storing the plurality of items.

16. A Radio Frequency Identification (RFID) system comprising:

at least one non-planar RFID tag associated with an item;

a first reader antenna;

a second reader antenna; and

a container for storing a plurality of items, wherein said first reader antenna is in the form of a loop substantially surrounding a volume of the container;

and wherein said second reader antenna is in the form of a loop in a plane parallel with one side of the container.

17. The Radio Frequency Identification (RFID) system as recited in claim 16, wherein said second reader antenna is attached to the one side of the container.

18. The Radio Frequency Identification (RFID) system as recited in claim 16, wherein said container includes a form factor for forcing the item associated with said at least one non-planar tag into a specific orientation relative to at least one of said first and second reader antennae.

19. The Radio Frequency Identification (RFID) system as recited in claim 16, wherein said container includes an inner shell that is transparent to RF energy, and an outer shell that blocks RF energy.

20. The Radio Frequency Identification (RFID) system as recited in claim 16, wherein said at least one non-planar RFID tag is affixed to a bottle having a cylindrical shape.

21. The Radio Frequency Identification (RFID) system as recited in claim 16, further comprising a plurality of containers having multiple reader antennas

for reading RFID tags affixed to planar and non-planar prescription medicine items.

22. A Radio Frequency Identification (RFID) system comprising:

at least one planar RFID tag associated with an item;

a first reader antenna;

a second reader antenna; and

a container for storing a plurality of items, wherein said first reader antenna is in the form of a loop substantially surrounding a volume of the container; and wherein said second reader antenna is in the form of a loop in a plane parallel with one side of the container.

23. The Radio Frequency Identification (RFID) system as recited in claim 22,

wherein said container includes a form factor for forcing the item associated with said at least one planar tag into a specific orientation relative to at least one of said first and second reader antennae.

24. The Radio Frequency Identification (RFID) system as recited in claim 22,

wherein said at least one planar RFID tag is affixed to a bottle having a cylindrical shape.

25. A method of configuring at least one antenna in an RFID system used to read

RFID tags, comprising:

providing a first reader antenna oriented in a first plane and a second reader antenna oriented in a second plane;

identifying dead zones associated with the first reader antenna and second reader antenna; and

orienting the first reader antenna and second reader antenna so as to reduce the number of dead zones associated with the first reader antenna and second reader antenna.

26. The method of claim 25, wherein the orienting step further comprises providing a third reader antenna in a third plane, wherein the first, second and third planes are oriented in orthogonal planes relative to one another so as to reduce to zero the number of dead zones for the reading of RFID tags.

27. The method of claim 25, wherein the orienting step further comprises providing the first reader antenna with a loop form encircling a volume in the first plane; and providing the second reader antenna with a loop form wrapped around

two opposing sides of said volume, wherein the opposing sides are parallel to each other and orthogonal to the first plane.